

What is claimed is:

1. A diagnosis supporting device that is connected to a processor device that acquires an image signal of an image of a subject formed at the tip of an endoscope to convert said image signal into an output video signal for a monitor, said diagnosis supporting device comprising:

an image signal acquiring section that repeatedly acquires a reference image signal and a fluorescent image signal transmitted from said processor device, said reference image signal representing an image of a subject that is illuminated with visible light and said fluorescent image signal representing an image of said subject that is excited by irradiation with excitation light to emit fluorescence;

an observation image signal generating section that counts the number of pixels having the maximum brightness level in said reference image signal whenever said image signal acquiring section acquires a set of said reference image signal and said fluorescent image signal, then that calculates a difference between brightness level of a pixel in said reference image signal and brightness level of a pixel in said fluorescent image signal at the corresponding position for all of the pixels in said reference image signal when the number of counted pixels is not larger than a predetermined threshold number or for a part of the pixels selected from said reference image signal when the number of counted pixels is larger

than said threshold number, and that generates an observation image signal by converting the pixels in said reference image signal whose differences are larger than a predetermined value into specific pixels exhibiting a predetermined color;

a memory section that stores the observation image signal and updates it whenever said observation image signal generating section generates an observation image signal; and

an output section that reads said observation image signal stored in said memory section and that converts said observation image signal into an output video signal.

2. The diagnosis supporting device according to claim 1, wherein said observation image signal generating section calculates a difference between brightness level of a pixel in said reference image signal and brightness level of a pixel in said fluorescent image signal at the corresponding position for a part of the pixels selected from said reference image signal even when the maximum brightness in said reference image signal is smaller than a predetermined threshold level.

3. The diagnosis supporting device according to claim 1, wherein said observation image signal generating section standardizes brightness levels of all pixels in said reference image signal and said fluorescent image signal by converting the maximum brightness level into the maximum gradation, the minimum brightness level into

the minimum gradation and intermediate brightness levels into the respective corresponding gradations, and then said observation image signal generating section counts the number of pixels having the maximum gradation in all the pixels of the standardized reference image signal.

4. The diagnosis supporting device according to claim 3, wherein said observation image signal generating section selects 1/4 of all the pixels in said reference image signal as target pixels for calculating said difference when the number of the pixels having the maximum brightness level in said reference image signal is larger than said threshold number.

5. The diagnosis supporting device according to claim 1, wherein said observation image signal generating section generates said observation image signal by converting said reference image signal into a monochromatic RGB image signal after calculating said differences.

6. The diagnosis supporting device according to claim 1, wherein said specific pixels exhibit red.

7. The diagnosis supporting device according to claim 1, further comprising:

a probe that is led through a forceps channel of said video

endoscope to guide visible light for illuminating said subject and excitation light for exciting said subject to cause living tissue to emit fluorescence; and

a light source that makes visible light and excitation light be alternately incident on the proximal end of said probe.

8. The diagnosis supporting device according to claim 7, wherein said probe consists of a number of optical fibers that are bundled up with one another.

9. A diagnosis supporting device that is connected to a processor device that acquires an image signal of an image of a subject formed at the tip of an endoscope to convert said image signal into an output video signal for a monitor, said diagnosis supporting device comprising:

an information register that registers information representing a first condition or information representing a second condition;

an image signal acquiring section that repeatedly acquires a reference image signal and a fluorescent image signal transmitted from said processor device, said reference image signal representing an image of a subject that is illuminated with visible light and said fluorescent image signal representing an image of said subject that is excited by irradiation with excitation light to emit fluorescence;

an observation image signal generating section that determines whether the information registered in said information register represents the first condition or the second condition whenever said image signal acquiring section acquires a set of said reference image signal and said fluorescent image signal, then calculates a difference between brightness level of a pixel in said reference image signal and brightness level of a pixel in said fluorescent image signal at the corresponding position for all of the pixels in said reference image signal when the information representing the first condition is registered or for a part of the pixels selected from said reference image signal when the information representing the second condition is registered, and that generates an observation image signal by converting the pixels in said reference image signal whose differences are larger than a predetermined value into specific pixels exhibiting a predetermined color;

a condition deciding section that registers the information representing the first condition in said information register when the number of the specific pixels exceeds a threshold number and registers the information representing the second condition in said information register when the number of the specific pixels does not exceed said threshold number;

a memory section that stores said observation image signal and updates it whenever said observation image signal generating section generates an observation image signal; and

an output section that reads said image signal stored in said memory section and that converts said observation image signal into an output video signal.

10. The diagnosis supporting device according to claim 9, wherein said condition deciding section judges whether or not the number of the specific pixels exceeds the number corresponding to 5% of all the pixels for determining said first or second conditions.

11. The diagnosis supporting device according to claim 9, wherein said observation image signal generating section selects 1/4 of all the pixels in said reference image signal as target pixels for calculating said difference when the information registered in said information register represents said second condition.

12. The diagnosis supporting device according to claim 9, wherein said observation image signal generating section generates said observation image signal by converting said reference image signal into a monochromatic RGB image signal after calculating said differences.

13. The diagnosis supporting device according to claim 9, wherein said specific pixels exhibit red.

14. The diagnosis supporting device according to claim 9, further

comprising:

a probe that is led through a forceps channel of said video endoscope to guide visible light for illuminating said subject and excitation light for exciting said subject to cause living tissue to emit fluorescence; and

a light source that makes visible light and excitation light be alternately incident on the proximal end of said probe.

15. The diagnosis supporting device according to claim 14, wherein said probe consists of a number of optical fibers that are bundled up with one another.

16. A diagnosis supporting device that is connected to a processor device that acquires an image signal of an image of a subject formed at the tip of an endoscope to convert said image signal into an output video signal for a monitor, said diagnosis supporting device comprising:

an image signal acquiring section that repeatedly acquires a reference image signal and a fluorescent image signal transmitted from said processor device, said reference image signal representing an image of a subject that is illuminated with visible light and said fluorescent image signal representing an image of said subject that is excited by irradiation with excitation light to emit fluorescence;

an observation image signal generating section that counts

the number of pixels having the maximum brightness level in said reference image signal whenever said image signal acquiring section acquires a set of said reference image signal and said fluorescent image signal, that calculates, when the number of counted pixels is not larger than a predetermined threshold number, a difference between brightness level of a pixel in said reference image signal and brightness level of a pixel in said fluorescent image signal at the corresponding position for all of the pixels in said reference image signal and generates an observation image signal by converting the pixels in said reference image signal whose differences are larger than a predetermined value into specific pixels exhibiting a predetermined color, and that divides, when the number of counted pixels is larger than said threshold number, all pixels in both of said reference image signal and said fluorescent image signal into several groups to calculate an average value of brightness levels of the pixels in each of the groups, calculates a difference between the average value of a group in said reference image signal and the average value of a group at the corresponding position in said fluorescent image signal for every group and generates an observation image signal by converting the pixels in the groups in said reference image signal whose difference is larger than said threshold value into specific pixels exhibiting a predetermined color;

a memory section that stores said observation image signal and updates it whenever said observation image signal generating



section generates an observation image signal; and

an output section that reads said image signal stored in said memory section and that converts said image signal into an output video signal.

17. The diagnosis supporting device according to claim 16, wherein said observation image signal generating section divides all pixels in each of said reference image signal and said fluorescent image signal into several groups to calculate an average value of brightness levels of the pixels in each of the groups, calculates a difference between the average value of a group in said reference image signal and the average value of a group at the corresponding position in said fluorescent image signal for every group and generates an observation image signal by converting the pixels in the groups in said reference image signal whose difference is larger than said threshold value into specific pixels exhibiting a predetermined color even when the maximum brightness level in said reference image signal is smaller than a predetermined threshold level.

18. The diagnosis supporting device according to claim 16, wherein said observation image signal generating section standardizes brightness levels of all pixels in said reference image signal and said fluorescent image signal by converting the maximum brightness level into the maximum gradation, the minimum brightness level into the minimum gradation and intermediate brightness levels into the

respective corresponding gradations, and then said observation image signal generating section counts the number of pixels having the maximum gradation in all the pixels of the standardized reference image signal.

19. The diagnosis supporting device according to claim 18, wherein said observation image signal generating section selects 1/4 of all the pixels in said reference image signal as target pixels for calculating said difference when the number of the pixels having the maximum brightness level in said reference image signal is larger than said threshold number.

20. The diagnosis supporting device according to claim 16, wherein said observation image signal generating section generates said observation image signal by converting said reference image signal into a monochromatic RGB image signal after calculating said differences.

21. The diagnosis supporting device according to claim 16, wherein said specific pixels exhibit red.

22. The diagnosis supporting device according to claim 16, further comprising:

a probe that is led through a forceps channel of said video endoscope to guide visible light for illuminating said subject and

excitation light for exciting said subject to cause living tissue to emit fluorescence; and

a light source that makes visible light and excitation light be alternately incident on the proximal end of said probe.

23. The diagnosis supporting device according to claim 22, wherein said probe consists of a number of optical fibers that are bundled up with one another.